



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,154	01/10/2002	Evren Eryurek	30203/37762	1097

4743 7590 02/24/2005

MARSHALL, GERSTEIN & BORUN LLP  
6300 SEARS TOWER  
233 S. WACKER DRIVE  
CHICAGO, IL 60606

EXAMINER

LE, JOHN H

ART UNIT PAPER NUMBER

2863

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/044,154

Applicant(s)

ERYUREK, EVREN

Examiner

John H Le

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 December 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11, 13-19, 21-27, 29-34, 37-41 and 44-63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 54-63 is/are allowed.
- 6) ☒ Claim(s) 1-9, 18, 19, 21-25, 31-34, 37, 41, 44 and 48-53 is/are rejected.
- 7) ☒ Claim(s) 10, 11, 13-17, 26, 27, 29, 30, 38-40 and 45-47 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Response to Amendment***

1. This office action is in response to applicant's amendment received on 12/20/2004.

Claims 1, 21, 37, and 44 have been amended.

Claims 12, 20, 28, 35, 36, 42, and 43 have been cancelled.

Claims 54-63 have been added.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-9, 21-25, 37, 44, 48, 50-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhindsa et al. (USP 5,846,056) in view of Fisher et al. (USP 5,754,446).

Regarding claims 1 and 21, 37, and 44, Dhindsa et al. teach a monitoring system for use in estimating the existence of cavitation in a device (condition of pump) (e.g. Col.2, line 48-58, Col.3, lines 18-29), the monitoring system comprising: a processor (228); a memory (Col.8, lines 38-41) that stores a characteristic curve (pressure curve, Col.7, lines 41-46, pressure curve includes characteristics, Col.15, line 37) for the device; a collection routine (monitoring computer) adapted to be executed on the processor (228) to collect one or more operating parameters associated with the device

during operation of the device (e.g. Col.8, lines 15-41); and a monitoring routine (monitoring computer) adapted to be executed on the processor (228) that uses the one or more operating parameters (e.g. Col.7, lines 47-51, Col.8, lines 15-41) and the characteristic curve (pressure curve) (e.g. Col.7, lines 41-46) to estimate the presence of cavitation (condition of pump) within the device (e.g. Col.2, line 48-58, Col.3, lines 18-29, Col.8, lines 42-53, Col.11, lines 18-24), automatically detecting (a pump are detected by the microcontroller 220) the presence of cavitation within device (certain abnormal operating conditions relating to a pump, Col.8, lines 44-49, wherein the condition in the pump known as cavitation, Col.2, lines 54-58) based on the one or more collected operating parameter (monitoring computer store data and display data) and the characteristic curve (monitoring computer store data and display data, pressure curve)(Col.8, lines 15-41).

Regarding claims 2 and 22, Dhindsa et al. teach the memory also stores a model (programmed instructions) associated with the device (e.g. Col.8, lines 33-41) and wherein the monitoring routine (monitoring computer) is adapted to use the model (programmed instructions) to estimate a further operating parameter associated with the device (condition of the pumps) (e.g. Col.8, lines 12-28, Col.10, lines 24-28, Col.11, lines 18-24).

Regarding claims 3 and 23, Dhindsa et al. teach the monitoring routine (monitoring computer) is further adapted to use the estimated further operating parameter (e.g. Col.7, lines 47-51, Col.8, lines 15-41) and the characteristic curve (pressure curve) (e.g. Col.7, lines 41-46) for the device to estimate the presence of

cavitation within the device (condition of pump) (e.g. Col.2, line 48-58, Col.3, lines 18-29, Col.8, lines 42-53, Col.11, lines 18-24).

Regarding claims 4 and 24, Dhindsa et al. teach the one or more operating parameters includes a pressure indication (points pressure) associated with the device (e.g. Col.7, lines 1-18) and wherein the collection routine (monitoring computer) is adapted to collect the pressure indication (e.g. Col.7, lines 41-46).

Regarding claim 5, Dhindsa et al. disclose the operating parameters include a suction pressure indication (Col.5, lines 32-62).

Regarding claims 6 and 25, Dhindsa et al. teach the one or more operating parameters includes a fluid flow indication associated with the device and wherein the collection routine is adapted to collect the fluid flow indication (e.g. Col.5, lines 20-23, lines 35-39, 54-60).

Regarding claim 7, Dhindsa et al. disclose the operating parameters include a suction pressure indication and a suction fluid flow indication (Col.5, lines 32-62).

Regarding claim 8, Dhindsa et al. disclose the one or more operating parameters includes a pressure indication and a fluid flow indication associated with the device and wherein the collection routine is adapted to collect the pressure and fluid flow indications (e.g. Col.5, lines 20-23, lines 32-62).

Regarding claim 9, Dhindsa et al. disclose the operating parameters include a suction pressure indication and a suction fluid flow indication (Col.5, lines 32-62).

Regarding claim 48, Dhindsa et al. disclose the device including a pump mechanism (Abstract).

Regarding claim 50, Dhindsa et al. disclose the device including a pressure sensor (Col.4, lines 54-60).

Dhindsa et al. fail to disclose alert an operator the presence of cavitation in the device.

Fisher et al. disclose alert an operator to the presence of cavitation in the device (Col.7, lines 15-18, 41-50).

Regarding claims 51-52, Fisher et al. disclose a flow rate sensor (e.g. Col.3, lines 52-59).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include alert an operator the presence of cavitation in the device as taught by Fisher et al. in a reciprocating pump system of Dhindsa et al. for the purpose of providing a method and system for optimizing performance of a turbine power by a parameter indicative of cavitation (Fisher et al., Abstract).

4. Claims 18-19, 31-32, 41, 49, and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhindsa et al. (USP 5,846,056) in view of Fisher et al. (USP 5,754,446) as applied to claims 1, 21, 37, and 44 above, and further in view of Unsworth et al. (USP 6,757,665).

Regarding claims 18-19, 31-32, 41, and 53, the combination of Dhindsa et al. and Fisher et al. discussed supra, discloses the claimed invention except the monitoring system includes an expert engine, wherein the expert engine is a neural network.

Unsworth et al. teach the monitoring system includes an expert engine, wherein the expert engine is a neural network (Col.11, line 36-Col.12, line 26).

Regarding 49, Unsworth et al. disclose the pump mechanism includes an impeller (Col.10, lines 14-27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an expert engine, wherein the expert engine is a neural network as taught by Unsworth et al. in a reciprocating pump system of Dhindsa et al. in view of Fisher et al. for the purpose of providing a detection of pump cavitation (Unsworth et al., Col.10, lines 43-65).

5. Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhindsa et al. (USP 5,846,056) in view of Fisher et al. (USP 5,754,446) and Unsworth et al. (USP 6,757,665) as applied to claim 31 above, and further in view of Dorchak (USP 5,161,110).

Regarding claims 33-34, the combination of Dhindsa et al., Fisher et al., and Unsworth et al. discussed supra, disclose the claimed invention the expert engine includes step using a trending analysis, a fractal analysis.

Dorchak disclose the expert engine includes step using a trending analysis (Col.3, lines 64-67), a fractal analysis (Fig.2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an expert engine, wherein the expert engine is a neural network as taught by Dorchak in a reciprocating pump system of Dhindsa et al. in view of Fisher et al. and Unsworth et al. for the purpose of providing a hierarchical process control system, which substantially eliminates or reduces disadvantages and problems associated with prior control systems (Dorchak, Col.2, lines 20-24).

***Allowable Subject Matter***

6. Claims 54-63 are allowed.
7. Claims 10-11, 13-17, 26-27, 29-30, 38-40, 45-47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

In combination with other limitations of the claims, the cited prior arts fails to teach a monitoring routine adapted to be executed on the processor that uses the one or more operating parameters and the characteristic curve to estimate the presence of cavitation within the device and wherein the monitoring routine is adapted to determine a net positive suction head available in the device and compare the net positive suction head available with a net positive suction head required associated with the device, as recited in claim(s) 54.

In combination with other limitations of the claims, the cited prior arts fails to teach a monitoring routine adapted to be executed on the processor that uses the one or more operating parameters and the characteristic curve to estimate the presence of cavitation within the device and wherein the characteristic curve defines a net positive suction pressure required for the device, as recited in claim(s) 56.

In combination with other limitations of the claims, the cited prior arts fails to teach a monitoring routine adapted to be executed on the processor that uses the one



or more operating parameters and the characteristic curve to estimate the presence of cavitation within the device and wherein the characteristic curve is a voltage-current characteristic curve for the device, wherein the one or more operating parameters are associated with electrical operating parameters of the device and wherein the monitoring routine is adapted to use the electrical operating parameters of the device to detect whether the device is operating in accordance with the voltage-current characteristic curve of the device, as recited in claim(s) 57.

In combination with other limitations of the claims, the cited prior arts fails to teach a monitoring routine stored in the memory and adapted to be executed on the processor to use the one or more operating parameters to estimate the presence of cavitation in the process plant; wherein the monitoring routine is adapted to use the operating parameters to detect a degradation in the operational performance of a device in the process plant to estimate the presence of cavitation within the process plant, a characteristic curve associated with the device stored in the memory, and the monitoring routine is adapted to detect the degradation in performance based on the characteristic curve; and wherein the characteristic curve is a voltage-amplitude curve as recited in claim(s) 61.

In combination with other limitations of the claims, the cited prior arts fails to teach a monitoring routine stored in the memory and adapted to be executed on the processor to use the one or more operating parameters to estimate the presence of cavitation in the process plant; wherein the monitoring routine is adapted to use the operating parameters to detect a degradation in the operational performance of a device

in the process plant to estimate the presence of cavitation within the process plant, a characteristic curve associated with the device stored in the memory, and the monitoring routine is adapted to detect the degradation in performance based on the characteristic curve; and wherein the characteristic curve defines a net positive suction head required for device as recited in claim(s) 62.

### ***Response to Arguments***

8. Applicant's arguments filed 12/20/2004 have been fully considered but they are not persuasive.

-Applicant argues that the prior did not teach "alerting a user to the presence of cavitation in a device".

Examiner position is that Fisher et al. teach alerting a user to the presence of cavitation in a device (Col.7, lines 15-18, 41-50).

-Applicant argues that the prior did not teach, "monitoring system that uses the characteristic curve to estimate the presence of cavitation".

Examiner position is that Dhindsa et al. teach monitoring system (monitoring computer) that uses the characteristic curve (pressure curve) (e.g. Col.7, lines 41-46) to estimate the presence of cavitation (condition of pump) (e.g. Col.2, line 48-58, Col.3, lines 18-29, Col.8, lines 42-53, Col.11, lines 18-24).

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Specifically Fisher et al. has been added to another ground of rejection.

***Contact Information***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H Le whose telephone number is 571-272-2275. The examiner can normally be reached on 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Barlow can be reached on 571-272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Art Unit: 2863

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John H. Le

Patent Examiner-Group 2863

February 8, 2005



John Barlow  
Supervisory Patent Examiner  
Technology Center 2800